IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

BAD RIVER BAND OF THE LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS OF THE BAD RIVER RESERVATION,

Plaintiff,

v.

ENBRIDGE ENERGY COMPANY, INC., and ENBRIDGE ENERGY, L.P.,

Defendants.

Case No. 3:19-cv-00602-wmc

Judge William M. Conley
Magistrate Judge Stephen L. Crocker

ENBRIDGE ENERGY COMPANY, INC., and ENBRIDGE ENERGY, L.P.,

Counter-Plaintiffs,

v.

BAD RIVER BAND OF THE LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS OF THE BAD RIVER RESERVATION and NAOMI TILLISON, in her official capacity,

Counter-Defendants.

DECLARATION OF IAN B. PATON

ATTORNEY-CLIENT PRIVILEGED INFORMATION

I, Ian B. Paton, declare the following on the basis of personal knowledge to which I am competent to testify:

1. I am a consulting engineer with nearly 30 years of experience in the field of civil engineering, have worked for nearly 23 years at Wright Water Engineers, Inc. ("WWE"), a Denver-based water resources consulting firm and am licensed as a Professional Engineer in the State of Wisconsin.

2. On five separate occasions over the past five years, I have visited the area where Line 5 bisects a meander feature on the Bad River (referred to as "the Bad River meander") to observe the conditions of the bank and river there, including a visit most recently on February 8, 2023. Since then, I have continued to carefully monitor the conditions at the meander including river flow rates and weather and flood forecasts. I have done so through detailed review of photographs collected from ground-level cameras and aerial images collected by drones of the channel banks, as well as detailed review of the images and data collected during field visits to the site by representatives of the Bad River Band's Natural Resources Department (NRD) on May 5, 2023, and the Band's NRD, Enbridge and the Environmental Protection Agency on May 8, 2023. In recent weeks my review of meander conditions has occurred with increasing frequency and at least on a daily basis.

3. I have included in this declaration true and correct copies of images of the meander and the Bad River, which I have annotated at times to indicate the position of the pipeline and various other features. I have indicated under each of these images the source of the image.

4. As of Monday, May 8, 2023, less than 15 feet remains between the the Line 5 pipeline and the top of the Bad River channel bank at four separate locations, listed in order from downstream to upstream (see Figure 1 and Figure 2), with all values rounded up to the nearest half foot):

    - D series monuments: 14.5 feet
    - M3 series monuments: 12.5 feet
    - E series monuments: 11 feet

- Between the E and F series monuments: 13.5 feet

5. At the M3 monument series, the amount of channel bank currently remaining between the top of the bank and the Line 5 pipeline (approximately 12.5 feet) is just over 1 foot more than was lost in the 6 days between April 29 and May 5 (approximately 11 feet).

6. The recently observed erosion has been distributed spatially across multiple series of monitoring monuments (see Figure 1), and at a number of those series has occurred at a rapid pace. The estimated remaining distance between Line 5 and the top of the channel bank for different dates in 2023 is summarized below for five locations, which are described in order from downstream to upstream along the neck of the meander:

   a. D monument series:

Date (2023)	**Distance from top of channel bank to Line 5**
April 10	Greater than 34 feet (Based on February 2023 measurements at M3 monuments and alignment of channel bank)
April 29	Greater than 23 feet (Based on estimates at M3 monuments and alignment of channel bank)
May 8	14.5 feet
Total bank loss (Spring 2023)	Greater than 19.5 feet

   More bank was lost along the D monuments from April 10 to May 8 (over 19.5 feet) than currently remains between the Line 5 pipeline and the top of the channel bank (14.5 feet).

b. M3 monument series:

Date (2023)	**Distance from top of channel bank to Line 5**
April 10	34 feet remaining (Based on February 2023 measurement)
April 29	23-24 feet remaining (see Dkt. 627, Fig. 2)
May 5	12.5 feet remaining
Total bank loss (Spring 2023)	21.5 feet

More bank was lost along the M3 monuments from April 10 to May 5 (over 21 feet) than currently remains between the Line 5 pipeline and the top of the channel bank (12.5 feet).

c. E series monuments:

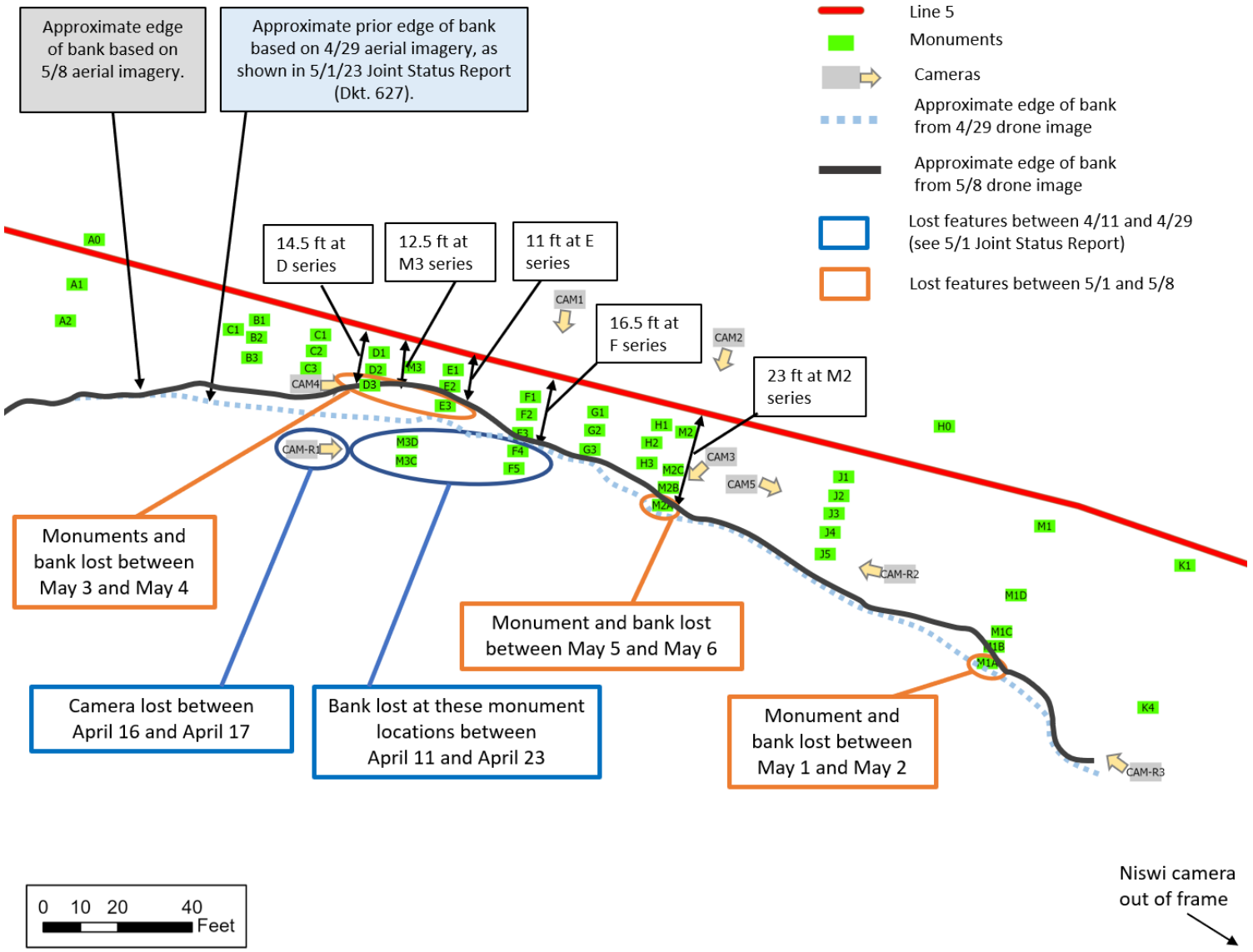
Date (2023)	**Distance from top of channel bank to Line 5**
April 10	Greater than 25.5 feet remaining (Based on F series measurement in February 2023 and curve of bank)
April 29	No estimate
May 5	13.5 feet remaining
May 8	11 feet remaining
Total bank loss (Spring 2023)	Greater than 14.5 feet

d. Location between the E and F series of monuments:

Date (2023)	**Distance from top of channel bank to Line 5**
April 10	Greater than 25.5 feet remaining (Based on F series measurement in February 2023 and curve of bank)
April 29	No estimate
May 5	13.5 feet remaining
Total bank loss (Spring 2023)	Greater than 12 feet

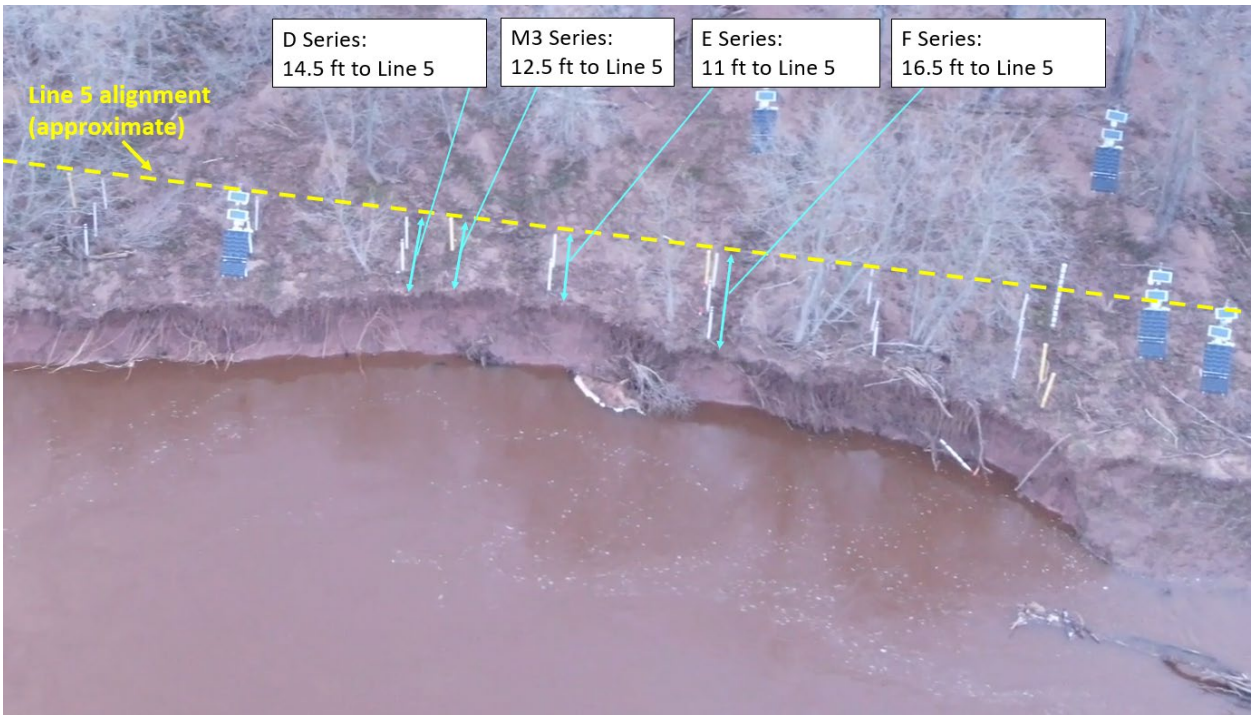
e. F series monuments:

Date (2023)	**Distance from top of channel bank to Line 5**
April 10	25.5 feet remaining (Based on February 2023 measurement)
April 29	17-18 feet remaining (see Dkt. 627, Fig. 2)
May 5	17 feet remaining
May 8	16.5 feet remaining
Total bank loss (Spring 2023)	9 feet



Note: Monuments lost to bank erosion in April and May 2023 include Monument D3, M3C, M3D, E3, F4, F5, M2A, and M1A.

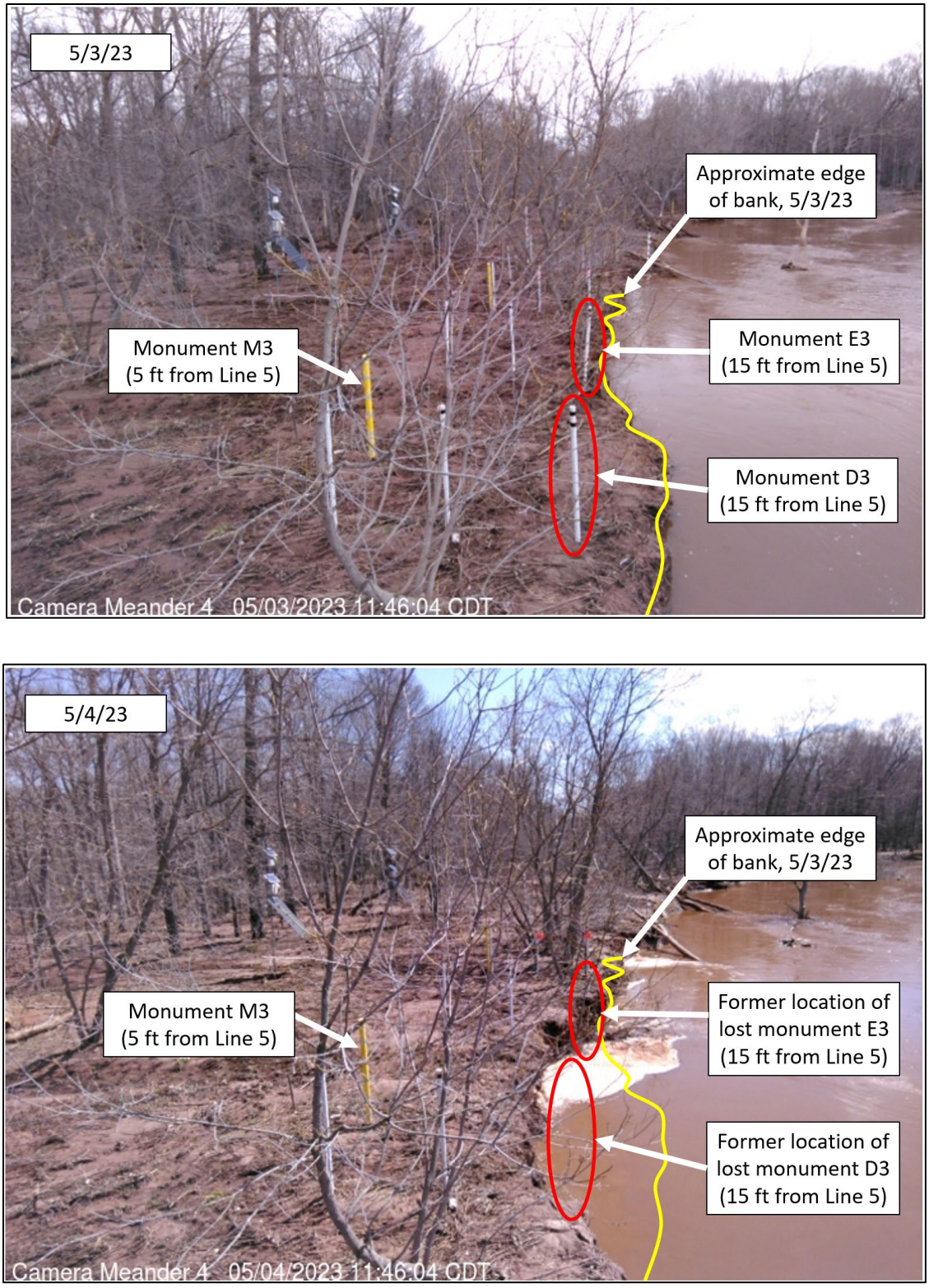
Figure 1. Schematic of monuments and distance from Line 5 to bank.



(Source: Bad River Band drone video, May 8, 2023, Flight 1, screenshot from time 08:11. Annotated by WWE.)

Figure 2. Annotated aerial image of meander monuments and distance to Line 5.

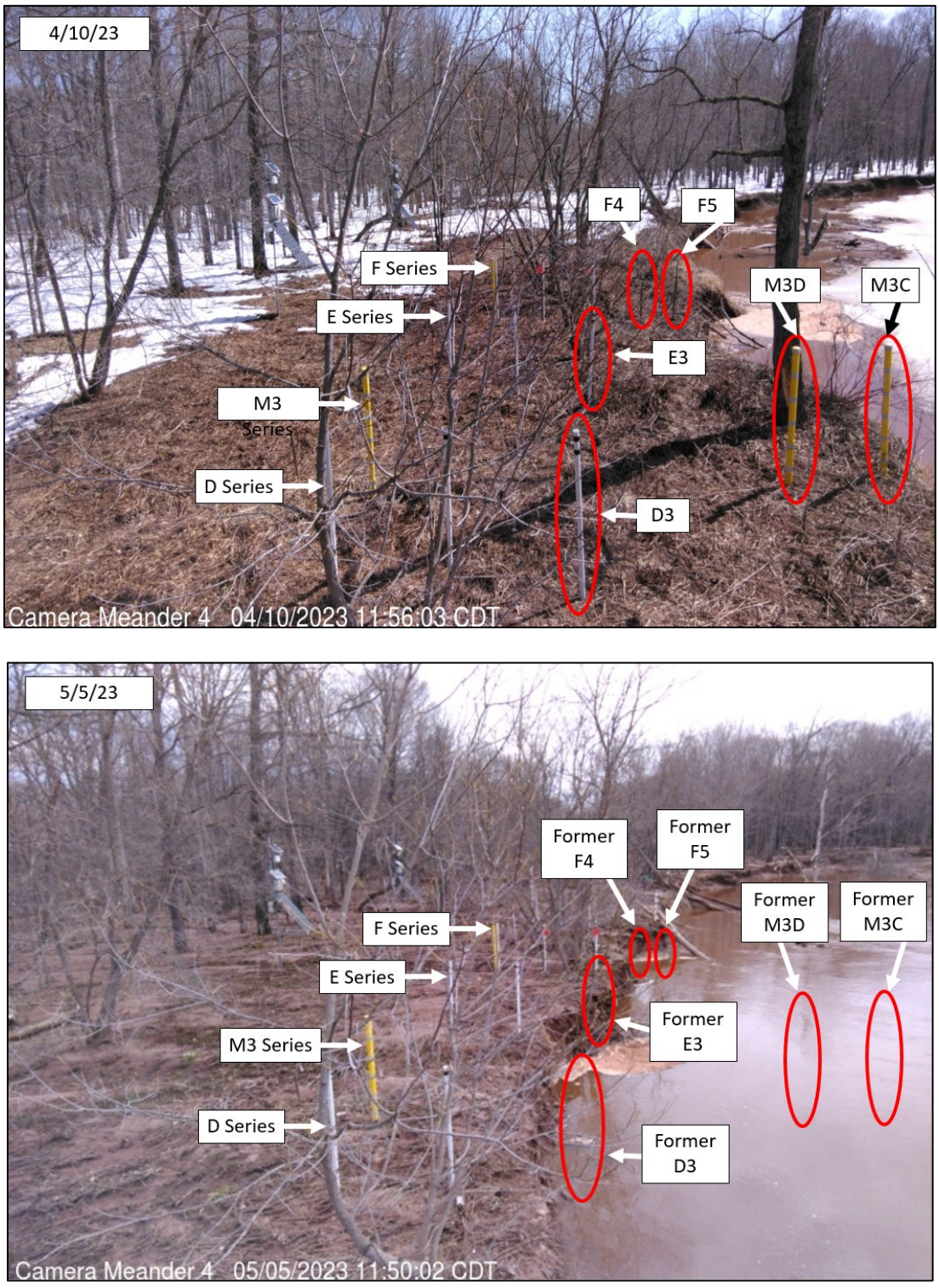
7. The rate of erosion during April and the first week of May 2023 has been particularly rapid at certain places along the bank. For instance, in one 24-hour period, from May 3 to May 4, 2023, an estimated 3 to 4 feet of bank erosion occurred at both the D and E-series of monuments (see Figure 3). The highest flow rate in the Bad River during this time period, measured at the United States Geological Survey (USGS) gage 04027000 near Odanah, Wisconsin at Elmhoist Road (and adjusting for the distance to the meander neck) was approximately 6,000 cfs; that flow rate is less than a 2-year event and corresponds with the rate when flow begins to spill out of the Bad River's main channel and through overflow channels across the meander neck as described in WWE's affirmative report (Section 3.2.2.2, page 76). (Note: All subsequent references in this declaration to USGS flow measurement data are for this gage).



(Source: Enbridge Meander Camera 4. Annotated by WWE.)

Figure 3. Comparison of Bad River bank in 24-hour period between May 3 and May 4, 2023 at D, M3, and E monument series.

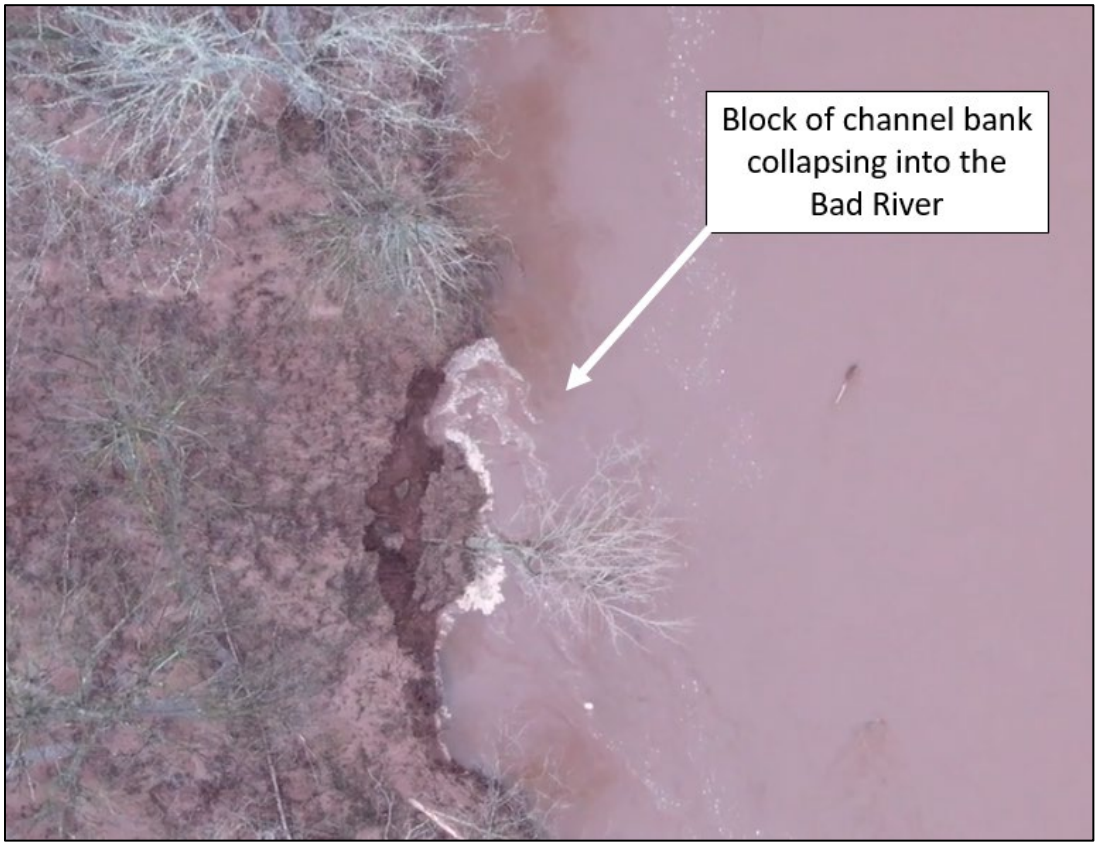
ATTORNEY-CLIENT PRIVILEGED INFORMATION



(Source: Enbridge Meander Camera 4. Annotated by WWE.)

Figure 4. Comparison of Bad River channel bank between April 10 and May 5, 2023 at D, M3, E, and F monument series.

8. The recent erosion has left large segments of the channel bank in an unstable condition. An image clipped from drone video collected on May 6, 2023 shows a block of channel bank with a tree collapsing into the Bad River immediately downstream from the narrowest portion of the meander neck (see Figure 5). This bank failure occurred while the flow rate in the river was less than 4,000 cfs, measured at the USGS gage, or between a 1- to 2-year event.



(Source: Bad River Band drone video, May 6, 2023, Flight 2, screenshot from time 03:30)

Figure 5. Drone image from May 6, 2023 of tree with channel bank collapsing into the river.

9. Photographs taken by the Band's Natural Resources Department during a May 5 field visit to the meander show cracks in the channel bank that indicate locations where the bank is more susceptible to large slope failures into the river (see Figure 6).

(Source: Bad River Band)

Figure 6. Photograph of cracks in channel bank at upstream end of meander neck taken on May 5, 2023.

10. In addition to the loss of soil, the erosion has resulted in the loss of a monitoring camera owned by the Band (shown as "CAM-R1" on Figure 1, located downstream from the M3 monument series). Another of the Band's monitoring cameras was moved to prevent it from being lost to erosion. Enbridge Camera 4 (used to observe an area with active bank erosion as shown on Figure 3 and Figure 4) was approximately 4 feet from the top of the channel bank as of May 5, 2023; this is

within the estimated amount of channel bank that has been lost within one day (see Figure 3).

11. The erosion observed during the past month was caused by elevated flows in the Bad River as a result of snowmelt and rainfall in the watershed. The flow rates from April 5 to May 5 measured at the USGS gage are shown on a hydrograph (see Figure 7).

12. The peak flow rates from April 5 to May 5, 2023, as measured at the USGS gage and shown on Figure 7 are:

- 13,900 cubic feet per second (cfs) on April 13, 2023
  (less than the 10-year event calculated value of 14,800 cfs; meaning there is a more than 10 percent probability of occurrence each year)
- 10,400 cubic feet per second (cfs) on April 21, 2023
  (less than the 5-year event calculated value of 11,600 cfs; meaning there is a more than 20 percent probability of occurrence each year)
- 10,900 cubic feet per second (cfs) on May 1, 2023
  (less than the 5-year event calculated value of 11,600 cfs; meaning there is a more than 20 percent probability of occurrence each year).

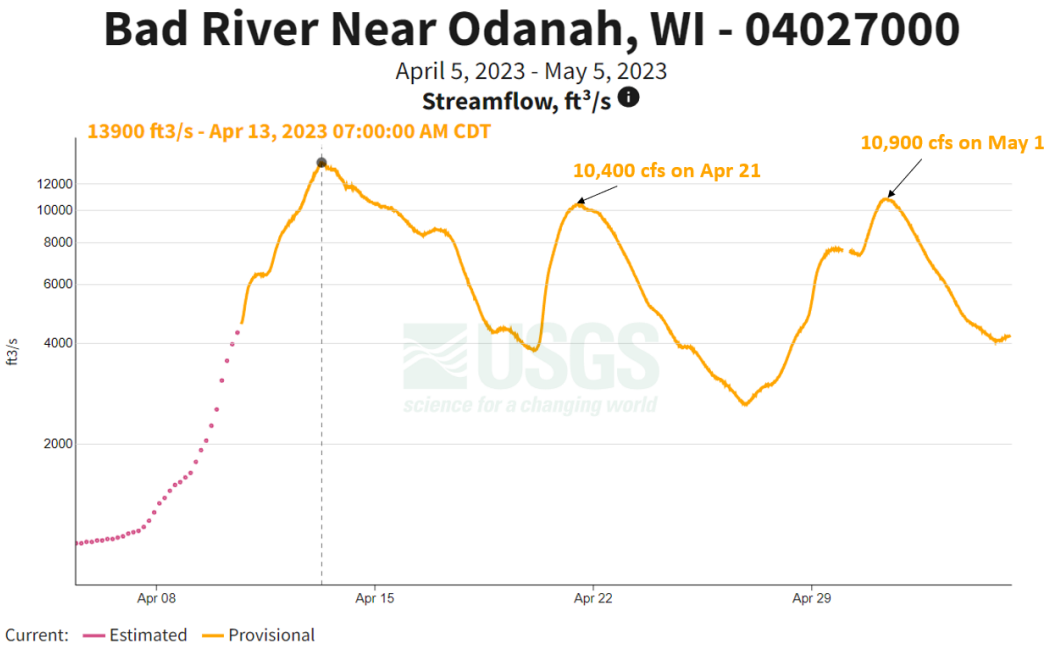


Figure 7. Hydrograph of Flows in the Bad River from April 5-May 5, 2023

13. Currently, there is less than 15 feet remaining between Line 5 and the top of the channel bank at four locations (from downstream to upstream):

    a. D series: 14.5 feet of bank remaining
    b. M3 series: 12.5 feet of bank remaining
    c. E series: 11 feet of bank remaining
    d. Between E and F series: 13.5 feet of bank remaining

14. Given the conditions that have been observed, there is an ongoing threat that Line 5 could become exposed and unsupported by ongoing bank erosion via multiple scenarios of runoff events and bank erosion:

    a. Based on review of ground camera imagery and aerial drone videos, undercut sections of the bank presently exist. There are also undercut areas where roots are visible and exposed (Figure 8). Undercut areas are prone to collapse and bank loss. If large vegetation with exposed roots loses support and falls into the river, several feet of bank can be lost. Such an event was recorded by a drone while it was occurring on May 6, 2023 (see Figure 5) and has also been observed previously at the Bad River meander (see Figure 9).

(Source: Bad River Band)

Figure 8. Photo from May 8 showing undercut bank and overhanging roots.

Figure 9. Example of bank loss caused by trees falling into river, April 16, 2019, from WWE's January 2022 affirmative report, Appendix O.

b. Additional high flows in the Bad River are not required for additional bank loss to occur. While the water levels in the Bad River have been near or above the bankfull level during the past month, the water provided pressure which supported the channel bank. As water levels recede to lower levels, bank sloughing can occur (as has been observed in the past week), further reducing the distance from the edge of bank to Line 5.

c. Additional rainfall events, even if relatively small, can cause additional erosion. Precipitation events causing heightened flows have occurred in late spring, summer, and fall in the Bad River watershed. As shown in Table 3 of WWE's affirmative report, since 2014 there have been events with flows greater than 6,000 cfs that occurred in May, June, July, August, September, and October. The flood of record, approximately 40,000 cfs, occurred in July

2016. It is not possible to predict the magnitude of future storm events that will occur during the remainder of 2023.

d. In addition to the possibility of a major flood event (such as a 100-year event) with significant associated erosion, smaller flows can also cause significant erosion. This has been observed recently, with an estimated 3 to 4 feet of bank loss at the D and E monument series in one day (see Figure 3) occurring when the flow in the Bad River was approximately 6,000 cfs, which is less than a 2-year event. In April 2020, 5 feet of erosion was observed in a one-week period associated with a flow event that had a peak flow less than 8,000 cfs (approximately a 2-year event) as described in Section 3.3.8.1 of WWE's January 2022 affirmative report.

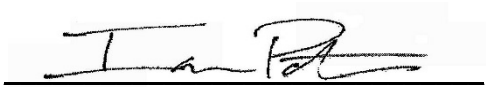
e. The conditions of the soil and vegetation adjacent to the pipeline may be different than the conditions near the current edge of bank. In the area immediately adjacent to the pipeline where the soil was disturbed to excavate a trench and bury the pipeline, the type of material and level of compaction may differ from the characteristics closer to the current edge of bank. In addition, vegetation clearing that has been done in the Line 5 Right of Way means there may be less root mass to provide stability to the soil. These factors create uncertainty with the soil conditions that may affect the rate of erosion.

f. Once Line 5 is exposed, the exposure of additional length of pipeline could occur rapidly and unpredictably. This process is documented in WWE's affirmative report, Section 4.1.8, page 107. In "Mechanics of local scour around submarine pipelines" in the Journal of Hydraulic Engineering, 1990, Chiew describes that piping—the process of subsurface erosion around a pipeline and an important mechanism through which pipeline scour occurs—is a progressive and self-perpetuating process. Multiple case studies from engineering articles and engineering periodicals show significant pipeline exposure and undermining occurring in single flood events. See, for example,

Samchek et al., "Case Studies of Scour and Erosion at Water Crossings" published by American Society of Civil Engineers (ASCE) in Pipelines, 2001, proceedings of ASCE Pipeline Division Specialty Conference. In addition, there are several examples of pipelines that became exposed, unsupported, and failed in a single flood event while a pipeline was being heavily monitored, including the Silvertip Pipeline crossing of the Yellowstone River in 2011.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: May 9, 2023



Ian B. Paton